ARJUNA JEE 2023

Atomic Structure

DPP-06

1. What is the shortest wavelength line in the Paschen series of Li^{2+} ion?

(1) $\frac{R}{9}$ (2) $\frac{9}{R}$

(3) $\frac{1}{R}$ (4) $\frac{9R}{4}$

2. The shortest wavelength in H spectrum of Lyman series when $R_H = 109678\ cm^{-1}$ is.

(1) 1002.7 Å

(2) 1215.67 Å

(3) 1127.30 Å

(4) 911.7 Å

3. Which of the following electron transitions in a hydrogen atom will require the largest amount of energy?

(1) From n =1 to n = 2

(2) From n = 2 to n = 4

(3) From n = 5 to n = 1

(4) From n = 3 to n = 5

4. The emission spectrum of hydrogen is found to satisfy the expression for the energy change, ΔE (in joules) such that $\Delta E = 2.18\times10^{-18}\left(\frac{1}{n_1^2}-\frac{1}{n_2^2}\right)J$

where n_1 = 1, 2, 3…… and n_2 = 2, 3, 4…...... The spectral lines correspond to Paschen series to

(1) $n_1 = 1$ and n_2 = 2, 3, 4

(2) $n_1 = 3$ and n_2 = 4, 5, 6

(3) $n_1 = 1$ and n_2 = 3, 4, 5

(4) $n_1 = 2$ and n_2 = 3, 3, 5

5. The number of possible spectral lines in Brackett series in hydrogen spectrum, when the electrons present in the ninth excited state return to the ground state, is

(1) 36 (2) 45

(3) 5 (4) 6

6. Find the value of wave number (v) in terms of Rydberg's constant, when transition of electron takes place between two levels of He^+ ion whose sum is 4 and difference is 2.

(1) $\frac{8R}{9}$ (2) $\frac{32R}{9}$

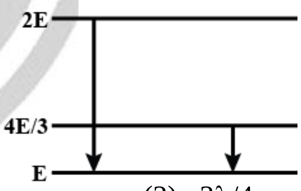
(3) $\frac{3R}{4}$ (4) None of these

7. What is the maximum wavelength line in the Lyman series of He ion?

(1) $3R$ (2) $\frac{1}{3R}$

(3) $\frac{4}{4R}$ (4) None of these

8. The given diagram indicates the energy levels of a certain atom. When the system moves from 2E level to E level, a photon of wavelength λ is emitted. The wavelength of the photon emitted during its transition from 4E/3 level to E level is



(1) λ/3 (2) 3λ/4

(3) 4λ/3 (4) 3λ

9. the energy difference will be minimum of which of the following energy levels of H – atoms?

(1) n = 2 and n = 3 (2) n = 3 and n = 4

(3) n = 1 and n = 2 (4) n = 1 and n = 4

10. When electron jumps from the fourth orbit to the second orbit in He^+ ion, the radiation emitted out will fall in

(1) ultraviolet region

(2) visible region

(3) infrared region

(4) radio wave region

Answer Key

1. (3)
2. (4)
3. (1)
4. (2)
5. (4)
6. (2)
7. (2)
8. (4)
9. (2)
10. (1)

